ENGIN STORAGE

TF
1
C2
1918
no 8
Engineering

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OFFICIAL PROCEEDINGS
Meeting of November, 1918

Volume XVII.
No. - - - 8

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1913

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MONTREAL

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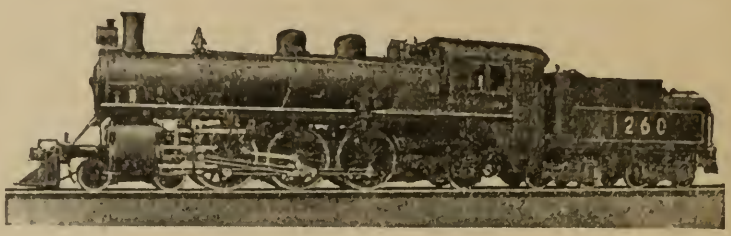

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PROCEEDINGS OF THE CANADIAN RAILWAY CLUB.

Windsor Hotel, Montreal,
November 12th, 1918.

Mr. T. C. Hudson in the chair.

Chairman:

Will the members please come to order, and kindly sign the membership cards which have been left on the seats? The next order of business is the reading of minutes of the previous meeting. The Secretary advises me that those minutes have been printed in book form and are being sent out to each member. Next in order are the remarks of the President. I will be as brief as possible to-night, and only wish to say that I am gratified with the large attendance at this meeting and am also glad that the epidemic which has been raging throughout the country, is now over, but which only disturbed us for one meeting, and I am sure we are all glad that we can now enjoy the benefits of peace and that the country can now turn its attention to getting in order to handle the business that pertains thereto.

Secretary:

Members Present.

R. Allan
J. R. Ayers
C. W. Barrett
F. Benger
L. A. Boucher
A. B. Brown
M. M. Campbell
M. E. Casey
J. Coleman
C. H. N. Connell
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C. Lentendre
E. E. Lloyd
J. McCarthy
D. R. Mackenzie
E. S.McMillan
E. S. M. Macnab
J. B. Macpherson
A. Marchant
W. J. Mathison
E. Meldrum
J. P. Milord
R. Macvicar
A. E. Mimms
C. G. Mitchell
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A. Pope
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G. W. Robb
W. C. Roberts
J. H. Rodgers
F. M. Rollo
A. H. Ross
D. Ross
W. H. Sample
B. F. Shortly
T. Sleigh
G. E. Smart
H. W. Thorp
J. E. Tinkler
C. Warnock
L. A. Williams
W. H. Winterrowd
A. Riddington
James Powell
and others

The Secretary will now read the list of proposed new members whose applications have already been passed upon by the Executive Committee and require your ratification.

Mr. President and members, I have the following applications to-night:

W. R. Boon, Supervisor of Bridges and Buildings, Canadian Northern Rly., 415 Lagauchetiere Street West, Montreal.
G. C. Briggs, Superintendent of Buildings, Canadian Northern Railway, Toronto.
R .C. Clark, Superintendent, Western Portal, C. N. R., 2267 Hutchison Street, Montreal.
M. Cummings, Inspector, Angus Shops (C. P. R.), Montreal.
E. J. Harvey, Tool Grinder, Angus Shops (C. P. R.), Montreal.
W. E. Joyce. Engineer of Design, Mt. Royal Tunnel Co., 411 Dorchester Street West, Montreal.
W. J. Robider, Gen. Master Car Builder, C. P. R., Windsor Street Station, Montreal.
S. H. Spry, Room 127b, Windsor Street Station (C. P. R.), Montreal.
S. J. H. Waller, 1285a de St. Valier Street, Montreal.

Mr. Arthur Allan:
I move their acceptance.

Mr. W. H. Sample:
I second the motion.

Chairman:
Moved by Mr. Allan, seconded by Mr. Sample, that these names be accepted. All those in favor please signify in the usual way.
Carried.
Chairman:

Next in order is unfinished business. Under this heading I wish to inform the members that at the meeting of the Executive Committee to-night, which was held before this meeting, it was decided that we would purchase $1,000.00 worth of Victory Bonds on behalf of the Club, subject to your approval. From the applause I take it that this approval will be unanimous.

Mr. Hunter:

I take great pleasure in moving that the action of the Executive Committee in buying $1,000.00 worth of Victory Bonds be ratified by the Club.

Mr. Norman Holland:

I second the motion.

Chairman:

Gentlemen, you have all heard the motion. Is there any discussion? All those in favor please signify in the usual way.

Carried unanimously.

Chairman:

I might explain to the members that while we held a meeting a month ago on the regular meeting night, it was decided at that time, owing to the epidemic abroad, that we would not have the paper read, which was to have been presented by Mr. Appleton of the Canadian Government Railways, but that it would be read at this meeting. I have a telegram from Mr. Appleton stating that he will be unable to be here to-night, owing to the train being detained, and he has asked Mr. George Smart to read the paper in his stead. I will therefore call upon Mr. Smart to read the paper.

Mr. Smart:

Gentlemen, I am sorry that Mr. Appleton is not here this evening, because I know that he has given this question a lot of thought and was prepared to answer any questions that might be asked by members of the Club.

"CO-ORDINATION OF THE VARIOUS BRANCHES OF THE MECHANICAL DEPARTMENT."

By W. U. Appleton, Supetrintendent of Motive Power, Canadian Government Railways, Moncton, N.B.

The subject of this paper is so extensive, it would be rather difficult to cover all its phases in one evening, and the writer has selected a few which he considers among the most important and hopes that with the resultant discussion, it may be of valuable assistance to those directly interested in arriving at a solution of many of the problems involved.

A system for regulating and combining the various branches of the Mechanical Department into one organization that will produce satisfactory service in the General Repair Shop and the Operating Department, obviously, must be broad and definite in its principles. Harmony between the various officers is essential and the relationship between the branches must be very intimate. Success cannot be obtained if the General Repair Shop and the Operating Departments are not closely allied, as if the Shop Superintendent is working with the one object "output" and the operating officers are not making every effort to obtain the greatest mileage from the locomotives consistent with good service and economy, failure is sure to result.

In order to get results, it is necessary that we should have his subordinate officers are giving the same attention to proper that co-operation whereby the Shop Superintendent and all repairs as to output, and it should be the object and pride of every Master Mechanic and his subordinate officers to obtain the greatest mileage between shoppings with the least number of failures.

To repair a locomotive quickly, cheaply and properly, should be the ambition of the Shop Superintendent.

To maintain it in service with a minimum expense and the greatest number of miles between failures and shoppings, should be the aim and object of the Master Mechanic.

When locomotives are sent to the shop there should be some system of defining the class of repairs required, and the writer believes that three classes as described below is the best method from the different points of view and sufficient to take care of all repairs.

No. 1—Meaning general repairs, including a new firebox, a new cylinder or other such extra heavy repairs.

No. 2—Meaning ordinary general repairs.

No. 3—Meaning specific repairs that may be carried out at the roundhouse or shop.

Abbreviations as follows should be used in conjunction with the numbers to describe specific repairs:

No. 1 Repair	Convers.	means	conversion to superheater, etc.
	Boil.	"	new boiler.
	F. B.	"	firebox.
	Cyl.	"	cylinder (1 or 2).
	Fra.	"	frames.
	Int.	"	internal examination.
	Ext.	"	external.
	Der.	"	derailment.
No. 2 Repair	Int.	"	internal examination.
	Ext.	"	external.
	Der.	"	derailment.
	T.	"	new tires.
No. 3 Repair	T. T.	"	tires turned.
	Fr. W.	"	frame welded.
	An. T.	"	annual test.
	Int.	"	internal examination.
	TU.	"	fixing up tubes.
	DB.	"	driving boxes.
	Der.	"	derailment.

No. 1 or No. 2 Repairs should not indicate any difference in the condition of the locomotives when turned out of the shop as far as the Operating Department is concerned, as the distinction is only made for the information and assistance of the shop force in effecting repairs, and either of these repairs should represent a locomotive in first class condition in every respect, and capable of making the standard mileage of its class, according to the physical characteristics of the division on which it is employed and the service it is in.

The condition of all parts of the locomotive should be as nearly balanced as possible in order to obtain the greatest mileage with the least loss of service, and it is false economy to turn locomotives out of the shop represented as having received the above classes of repair, with certain parts somewhat worn, due to having been renewed a short time previous to shopping. For instance, it may seem wasteful to renew tubes or some part of the machinery that is apparently still capable of making considerable mileage, but as these parts will become defective and make renewal necessary before those that were brought up to standard of shop practice, the

JNE 1ST 1918.

TYPE

FIC.

EIVED GENERAL REPAIRS URING PAST YEAR.

FEB.	MAR.	APR.	MAY	JUNE
413	401		415	420
417	435	.	416	438
			421	446
			438	1917
AUG	SEPT	OCT	NOV	DEC

GENERAL INFORMATION.

NO. OF LOCOS' TRIBUTARY TO MONCTON SHO	
IN ROUNDHOUSE SERVICE	338
IN REPAIR SHOPS & YARDS	31
TOTAL	369

CANADIAN GOVERNMENT RAILWAYS
PERFORMANCE OF LOCOMOTIVES.

EASTERN LINES DISTRICTS NOS 2,3,4,5 & 6. MONCTON SHOP ONLY — JUNE 1ST 1918.

THOUSAND MILES · RUN (ESTIMATED)

TYPE	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	95-100	100-105	105-110	110-115	115-120	120-125	125-130
PACIFIC.	415	401	413	426	469	404		423		420	437	412	414	445	409	433	402	463		465	407					
	416	435	417	444		407				430	453	441	440	446	419	448	462	464			425					
	421		418	468							454			449		466	467									
	438																									

41 LOCOMOTIVES AVERAGE MILEAGE 58500
2 LOCOS WAITING OR REPORTED FOR REPAIRS.

100000 MILES

SANTA FE			2017																							

1 LOCOMOTIVE AVERAGE MILEAGE 8231

MIKADO.		2877	2869	2868	2900			2841	2805	2800	2801	2810														
		2879	2870	2911					2806	2803	2802															
		2881	2871	2912					2812	2808	2804															
			2872	2913					2817	2809	2807															
			2873	2914					2818	2811	2831															
			2875	2915					2836	2813	2834															
			2918	2916					2838	2814	2835															
			2919	2917					2842	2815																
				2920					2843	2816																
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				2926					2845	2821																
									2846	2820																
									2847	2822																
										2828	2837															
										2832	2839															
										2838	2840															

64 LOCOS AVERAGE MILEAGE 36700

60000 MILES

10-WHEEL.	643	615	613	601	605	612	603		606		602	617	623													
		627	626	604	607		620		609		621	645	644													
		629	646	608	622				624		637															
		640		618					625																	
									628																	

30 LOCOMOTIVES AVERAGE MILEAGE 35100
1 LOCO. WAITING OR REPORTED FOR REPAIRS

40000 MILES

CONSOLIDATION 201 UP	305	316	276	294	201	288	281	202	271	209	280	267	266	277	306	308	303
	309	307	301	298	208		284	203	273	210	296	268				315	308
					290		287	204		285	310	269					
					293		289	205				272					
					297		311	206				278					
					299			207									
					300			270									

48 LOCOMOTIVES AVERAGE MILEAGE 43400
3 LOCOS WAITING OR REPORTED FOR REPAIRS.

20000 MILES

1	4	10	2	3	48	42	12	21	8	50	11	55	114				
6	13	25	18	83	57	74	14	24						5			

58

RECEIVED GENERAL REPAIRS DURING PAST YEAR.

JAN.	FEB.	MAR.	APR.	MAY	JUNE
418	413	401		415	420
444	417	435		416	438
				421	446
				438	1917

JULY	AUG.	SEPT.	OCT.	NOV	DEC.
430		404		447	426
		1917			

JAN.	FEB.	MAR.	APR.	MAY	JUNE

JULY	AUG.	SEPT.	OCT.	NOV.	DEC.

JAN.	FEB.	MAR.	APR	MAY	JUNE

JULY	AUG.	SEPT.	OCT.	NOV.	DEC.

JAN	FEB.	MAR.	APR.	MAY	JUNE
615	626	629	640	643	603A

JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
626	607	604	608	613	601
		605	646	618	612
		622			627
		1917			

JAN.	FEB.	MAR.	APR	MAY	JUNE
301	276	316	307	305	261A
				309	281A

JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
270	282	208	293	298	
284	283	300	297		
311			299		
		1917			

JAN.	FEB.	MAR.	APR	MAY	JUNE

JULY	AUG.	SEPT.	OCT.	NOV.	DEC.

GENERAL INFORMATION.

NO. OF LOCOS' TRIBUTARY TO MONCTON SHOPS
IN ROUNDHOUSE SERVICE 338
IN REPAIR SHOPS & YARDS 31
TOTAL 369

LOCO. MILEAGE FOR APRIL 1918
AVERAGE PER LOCO IN SERVICE 2392

11 LOCOMOTIVES SHOULD RECEIVE GENERAL REPAIRS PROPORTIONATE TO ABOVE MILEAGE EXCLUDING ACCIDENTS.

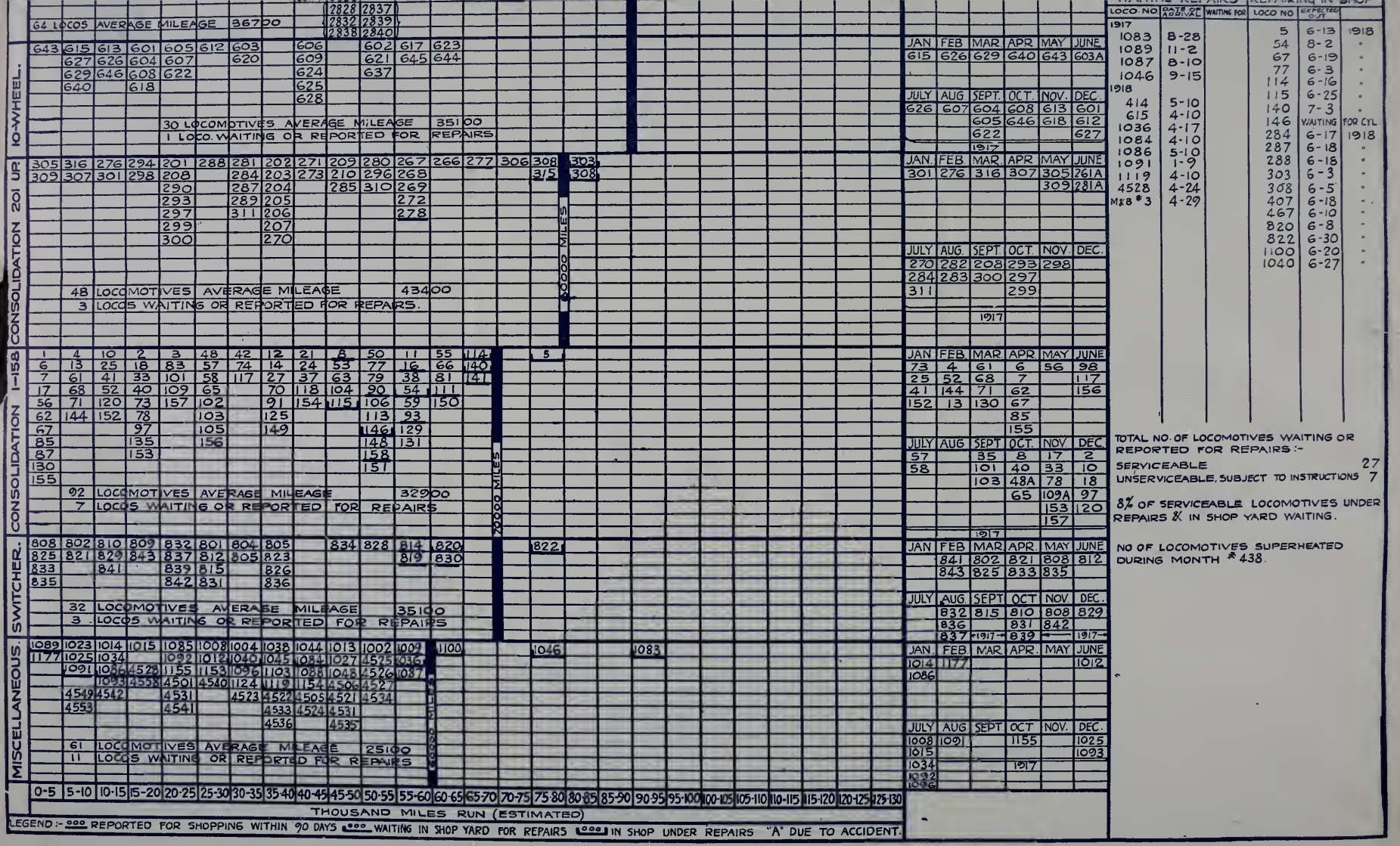
11 LOCOMOTIVES RECEIVED GENERAL REPAIRS AND 2 LOCOMOTIVES RECEIVED SPECIAL LIGHT REPAIRS DURING MAY 1918.

5 LOCOS SENT IN FOR GENERAL REPAIRS BEFORE MAKING STANDARD MILEAGE.

LOCO. NO.	MILEAGE	DIST.	LOCO. NO.	MILEAGE	DIST.
54	55725	4			
115	43454	6			
146	51821	2			
467	80337	3			
1040	27992	3			

LOCOMOTIVES REPAIRING & IN SHOP YARDS

WAITING REPAIRS			REPAIRING IN SHOP		
LOCO. NO	DATE OF ARRIVAL	WAITING FOR	LOCO NO	EXPECTED OUT	
1917			5	6-13	1918
1083	8-28		54	8-2	"
1089	11-2		67	6-19	"
1087	8-10		77	6-3	"
1046	9-15		114	6-16	"
1918.			115	6-25	"
414	5-10		140	7-3	"
615	4-10		146	WAITING	FOR CYL.
1036	4-17		284	6-17	1918
1084	4-10		287	6-18	"
1086	5-10		288	6-18	"
1091	1-9		303	6-3	"
1119	4-10		308	6-5	"
4528	4-24		407	6-18	"
M&B #3	4-29		467	6-10	"
			820	6-8	"
			822	6-30	"
			1100	6-20	"
			1040	6-27	"


10-WHEEL.
64 LOCOS AVERAGE MILEAGE 36700
30 LOCOMOTIVES AVERAGE MILEAGE 35100
1 LOCO. WAITING OR REPORTED FOR REPAIRS
CONSOLIDATION 201 UP.
48 LOCOMOTIVES AVERAGE MILEAGE 43400
3 LOCOS WAITING OR REPORTED FOR REPAIRS.
60000 MILES
CONSOLIDATION 1-158
92 LOCOMOTIVES AVERAGE MILEAGE 32900
7 LOCOS WAITING OR REPORTED FOR REPAIRS
70000 MILES
SWITCHER.
32 LOCOMOTIVES AVERAGE MILEAGE 35100
3 LOCOS WAITING OR REPORTED FOR REPAIRS
MISCELLANEOUS.
61 LOCOMOTIVES AVERAGE MILEAGE 25100
11 LOCOS WAITING OR REPORTED FOR REPAIRS
60000 MILES
0-5 5-10 10-15 15-20 20-25 25-30 30-35 35-40 40-45 45-50 50-55 55-60 60-65 65-70 70-75 75-80 80-85 85-90 90-95 95-100 100-105 105-110 110-115 115-120 120-125 125-130
THOUSAND MILES RUN (ESTIMATED)
LEGEND:- 000 REPORTED FOR SHOPPING WITHIN 90 DAYS (000) WAITING IN SHOP YARD FOR REPAIRS [000] IN SHOP UNDER REPAIRS "A" DUE TO ACCIDENT.
LOCO. NO | DATE OF ARRIVAL | WAITING FOR | LOCO NO | EXPECTED OUT
TOTAL NO. OF LOCOMOTIVES WAITING OR REPORTED FOR REPAIRS:-
SERVICEABLE 27
UNSERVICEABLE, SUBJECT TO INSTRUCTIONS 7
8% OF SERVICEABLE LOCOMOTIVES UNDER REPAIRS & IN SHOP YARD WAITING.
NO OF LOCOMOTIVES SUPERHEATED DURING MONTH * 438.

result usually is: engine out of service when badly required—delay in effecting repairs—and higher cost of doing so on account of lack of facilities at engine-houses as compared with shops.

No.3.Repair—This differs entirely from those referred to. It represents specific work and may be done at engine-houses or shops, and is sometimes the result of an accident to or failure of some particular parts, but is generally due to ordinary wear and tear of certain parts of the locomotive that are subject to the most severe service.

The parts subject to the greatest wear would not, if the locomotive is properly maintained while in service, represent sufficient work to justify a No. 1 or No. 2 repair, and in order to enable these parts to continue their work until the locomotive is generally worn to the extent necessary to justify a shop repair, it is usually economical to effect such repairs.

The latter class of repair generally consists of partial renewal of tubes and flues, rod bearing work, lining up wedges, examination of pistons and valves, refitting main driving boxes and sometimes tire turning, and removal of lateral play from wheels. The parts requiring attention will, of course, be found to vary considerably with the different classes of locomotives as well as with the different classes of service they give and the subdivisions on which they are employed. In some classes of locomotives on some subdivisions the tubes and flues will run from shopping to shopping with very little trouble, while others on the same division, or the same class on other division will require partial renewal when little more than half the required mileage has been accomplished.

The constant introduction of larger power is so changing conditions as to make the question of doing No. 3 repairs at engine-houses one of considerable controversy and the question naturally arises as to the best method of taking care of this work.

In the writer's opinion the No. 3 repair should be continued and not confused with the heavier repairs under classes 1 and 2, this being important in order to determine the condition of the power at all times based on mileage made according to class of repairs, and to avoid expenditures being made on the power that should not be necessary.

Facilities at engine-houses are generally inadequate to take care of this work except on the smaller and medium classes of power. At enginehouses where there is a heavy fluctuation in traffic it is an advantage to have a No. 3 repair gang, as it enables those in charge to hold their staff together and they

can be employed to advantage on running repairs when necessary.

In general repair shops where the work is done on schedule and arranged so that the engines will be turned out at regular intervals and No. 3 repairs cannot be taken care of without interfering with the regular work, it is a debatable question as to the advisability of breaking up the organization in order to take care of this work, although under existing conditions there is usually no alternative.

The changing conditions will, no doubt, make it necessary to provide certain space in general repair shops for this class of work, where it may be done at lower cost than at engine-houses, but where locomotives have to be hauled or worked a long distance to get to the general repair shop for such repairs, it might be advisable to provide a small shop for this class of repair, if the number of engines tributary to the same is sufficient to justify it.

To enable the Shop Superintendent to plan his work and maintain his schedule, it is only fair that he should be given all the advice possible as to the class of repair, and a list of the important parts that require replacement at least 30 days in advance of the locomotive coming to the shop. While it may not always be possible to do this on account of engines being damaged in accidents, there is no reason why it cannot be done to a very large extent in ordinary service. A form for reporting the work, as shown below, has been found to be very satisfactory.

7 31 17 1M

Form 577

CANADIAN GOVERNMENT RAILWAYS

REPORT OF SHOP REPAIRS REQUIRED

Station.....Date.....

Mr. .....Ry.
General Master Mechanic.

Locomotive No.....requires the following repairs and should be shopped within .....days

Estimated class of repairs..... (See Main Card 99 M. R2.)

Give general description of repairs required and describe any special or unusual defect, particularly defective counterbalance, cracked cylinders and those defects which are difficult to discover when engine is in shop.
If No. 3 repair, describe fully what work is required to be completed in the shops.

STANDARD MILEAGE BETWEEN REPAIRS, EITHER NO. 1 OR NO. 2

Pacific	100,000	Ten-wheel	90,000
Consolidation, C1 Class	70,000	Switching	50,000 to 60,000, or 2 years' service
Consolidation, C2, 3 & 4 Classes	80,000		

Miles made since last No. 1 or No. 2 repair.....Mileage less or more than standard.....%

Class of Service.....To be repaired at.....

Estimated cost of repairs : Labor.....Material.....Total.....

Last No. 1 or No. 2 repair.....Place.....Class of repair.....

Cost: Labor.....Material.....Total.....Per mile.....

Date of last No. 3 repair.....Date of last Flexible Staybolt Examination .....

Date of last internal examination.....Date of last annual test .....

Date of last external examination.....

Engineman ..... Checked and signed, Foreman.....

General Boiler Inspector.....Master Mechanic.....

Shopping Approved: Cost and Mileage Clerk.....

....
General Master Mechanic Supt. Rolling Stock

Date.....

Actual cost of above repairs:

Labor.....Material.....Total.....Per Mile.....

When making out this report of shop repairs required, Master Mechanics should devote particular attention to the note advising them to describe any special or unusual defect.

We all know that when a group of engines is built from the same drawings, even though all the parts are duplicate in every respect, no two of these engines will behave alike in service, but that each individual machine will have its own peculiar virtues and vices. For instance, one engine may jig and ride badly, perhaps the fault is more apparent at certain speeds than at others, and again it may vary with the position of the reverse lever and according to whether the engine is working hard or light.

There are several things which might cause this trouble, and unless full particulars are given the real cause may be overlooked; but if the Master Mechanic will take particular care to describe the defect with all the symptoms he will give the Shop Superintendent a chance to determine the seat of the trouble.

On taking over an engine from the shop after repairs the Operating Department should keep a very sharp lookout for any defect which may be actually present or beginning to develop, and these defects should be completely reported to the Shop Superintendent within 30 days of the date the engine goes into service.

What too often happens is that the Operating Department will run the engine until there is a failure and then endeavor to throw the whole blame for the failure on the shops, whereas they are really as much to blame as the shops for not reporting the defect in good time.

There are some kinds of defects which often manifest themselves on an engine from the shops, which will disappead after a few days or a few weeks in service, and the Operating Department often makes the mistake of neglecting to report these defects, as they feel confident that the engine will come round to her work after a week or two in service. Very often their judgment proves correct, but the best policy in cases of this kind is to report the defect immediately, keep a strict watch on it and if no improvement is noticeable within a very short time the defect must be rectified to avoid any chance of engine failure.

The standard maintenance regulations in force on most roads, if faithfully carried out, will prevent a very large percentage of ordinary running failures, but there is a class of failure which cannot be guarded against by any such regu-

lations. I mean failures due to faulty design and poor material.

To deal with the failures of this kind is, obviously, the business of the Engineering Department, and their first and greatest effort should be to locate the prime cause of the failure. Very often the actual part which fails is not the part which is at fault, and if we go ahead blindly and strengthen this part, the evil will not only break out in another place, very likely with worse results, so that the maxim of the Engineering Department should be first to find the absolute root of the trouble and then rectify it.

Regarding the mileage that should be obtained from the different classes of locomotives:

To determine this, considerable study and investigation would be required, and, in the writer's opinion, a minimum mileage requirement should be established for all sub-divisions for the various classes of locomotives according to service, after receiving a No. 1 or No. 2 repair—and if this is not done there is every possibility of locomotives being shopped for expensive repairs before actually required, while others, overdue for shopping on a basis of work done, remain in service, a source of trouble and expense to everybody. We make tests and establish standards as to tonnage that locomotives of the same class shall haul and they are not arbitrary for all divisions irrespective of grades and curves—then why require a locomotive to make as much mileage with the same amount of repairs if in way-freight service on a heavy division as in through service on a light division?

Locomotives in assigned service will, I am satisfied, make more mileage at less cost than those in the pool, and in a given time—say 18 months—the assigned engine will possibly make the greater mileage, due to its receiving more care and attention which will keep it in continuous service; but in a rush of traffic for a short period the pooled engine will make the greater mileage. Where traffic is fairly steady I believe that the assigned system is the best, but where heavy fluctuations in traffic have to be met, it might entail too great a capital outlay. I have known a locomotive in assigned service, when the engineer was taking an interest in his work, to make 55% more mileage than a locomotive of the same class, in the same service and division, in the pool.

The movement of power from one division to another should be done only under the advice of the Motive Power Department, i. e., as far as selection of locomotives of the same class is concerned, otherwise it would possibly result in some

roundhouses having a high percentage of power over the shopping period and others with a similar proportion of power just out of the shop.

In order that we may have a comprehensive idea of the condition of our power at all times, the monthly statement reproduced below has proved to be of considerable value. The form is self-explanatory and it is easy to get an idea of the condition of any particular locomotive, of the general condition of a particular class of locomotive, of the number of locomotives due for shopping or shortly to become due for shopping and a host of other information.

Monthly Mileage Report of Engines Tributary to Moncton Shops, June 1st, 1918.

(*See Chart*)

It will be noticed that in the mileage set for different classes of locomotives to accomplish, there is no provision made for the class of service in which the locomotive is engaged, and it is therefore necessary sometimes to reduce the mileage required for locomotives working under severe conditions, such as way-freight service on a heavy division. It is a difficult and unsatisfactory matter to make rigid laws in cases of this kind and the rules are necessarily slightly elastic. elastic.

To sum up, I would like to say that co-operation between the various branches of the Mechanical Department depends very much more on the men than on the system, and if the heads of the different departments all pull together with the idea of attaining greater efficiency and their subordinates back them up to the full extent of their ability, it will not be difficult to get results.

The Operating Department should be very careful and very complete with their reports of repairs required when sending locomotives to the shop and should promptly report any defects in engines turned out of the shop.

The Shops Department should work conscientiously with the idea of making all locomotives good for their full mileage, and should pay special attention to any peculiar or unusual defects reported by the Operating Department.

The Engineering Department should be ready at all times with advice and assistance to the Shops and Operating Departments, and when investigating any defects should spare no pains to get right at the root of the trouble before attempting to eliminate it.

Chairman:

The paper this evening is a very good summing up of what the Canadian Government Railways find is the best practice of handling their locomotives to obtain the most mileage, and also outlines very clearly how they handle their shop repairs. I may have some remarks to make later on, but in the meantime the paper is open for discussion.

Mr. W. H. Sample:

Mr. President and gentlemen, I have listened to the paper very attentively and I do not think anybody could criticize it. It is a very fine paper. Mr. Appleton has touched on all the points, or nearly so, and there is not much left to talk about. There is a great deal of difference in opinion of the different men on different roads about the handling of power, both at the shops and at roundhouses, also on the road. Mr. Appleton's idea as to classification of repairs is very good. The United States Government have a classification which is very similar but they have two more classes. They have what they call the unqualified class, which means that if the tubes are not renewed or the tires are not turned, it is unclassified repairs, but I think that is over-critical and I cannot see what object there is in it, although they evidently have some reason for it.

Unless in a very bad water district I do not approve of putting in a partial set of tubes—at least that is our practice. We believe that if tubes are properly applied in the first place they will run through the engine's mileage without being changed, and if you change a partial set you only add to your troubles in keeping track of the reports we have to make to the governments. We tried that with our superheater locomotives a few years ago, and undertook to run the superheater tubes through two shoppings but changed the boiler tubes every shopping, but we found that we had superheater tube troubles and then we would have alternate trouble with the boiler tubes, consequently we had more failures than when both kinds of tubes were changed together. We weld in our superheater tubes and also weld in our boiler tubes in some districts. In other districts we do not weld them in until they have completed a certain mileage. I see that Mr. Appleton has not touched upon this feature of the subject. Speaking of the Shop Superintendent, I never have seen any but who looked after the shop interest more than they did after the roadman's interest. As a rule they calculate to do a good repair, but they also calculate to get a good output. That is

all right, but I believe in doing the work properly whether we get a good output or not. If you cannot get the output but get the quality in the work you will get duration in it after it comes out. Neither do I think an engine should be neglected after it goes out of the shop. A good many roads believe in running their power to death and do not look after it at the roundhouses. I never could understand this. I believe that if any company is well enough off to have property it is well enough off to look after it, instead of allowing it to go to pieces and in a short time become useless. I do not know that I can add any more except that I feel Mr. Appleton should be highly commended for his paper, as he has evidently given the subject a great deal of study.

Mr. Smart:

I am not competent to answer any questions on this paper and want to talk in a general way. I think that our locomotive men and men in charge of roundhouses have a golden opportunity now to build a splendid foundation for explaining any failures they are going to have this winter. The paper explains the details of shop organization, and there is no doubt about it—if the shop organization gets full support from the outside organization it means a good deal to the Superintendent of the shop. A locomotive is very much the same as a car. It will go in the shop for a certain class of repairs, but there are certain peculiarities about it that the outside man who has seen it in operation is familiar with and he should be in a position to advise the shop organization of the work which is required. Another point was that a locomotive might be of the same pattern but not be the same locomotive. This is true of all railway equipment. It might be a passenger car or a truck. There must be some members in this meeting to-night who have charge of locomotive work and who should be glad to get up and say a few words. Mr. Appleton would have been here to-night if he could and would have been glad to enter into discussion of the paper.

Mr. Sample:

In the first place, I would like to ask the locomotive men here what is an engine failure?

Chairman:

My experience is that it is anything that detains a train five minutes, although the same train may reach the terminal on time. These are conditions we have to meet.

Mr. Mimms:

Being in the mechanical department, I am particularly interested in the co-ordination of the mechanical department with the operation of the road and shop. In my opinion the tendency on most roads is for these departments to be too far apart to obtain the best results.

Many times the minor troubles of an outside man, which while not causing much money, often cause serious delays which can be eliminated by action in the drawing office. At the same time if the draughtsmen are in close touch with the road and shop, they will, in designing, be able to avoid many errors.

Another salient portion of this report is that referring to the necessity of determining the true source of trouble when an epidemic of failures occurs, in order that changes will result in their removal. The ordinary failure reports which are taken in from the line are sometimes of little value. The draughtsman who endeavors to overcome troubles requires complete information before he can do anything. This question of reports of failures, it seems to me, is of great importance.

Mr. Ross:

Mr. Chairman, I feel I can learn more by listening to the discussion on this paper than by taking part. All a locomotive foreman has to do is to give the cause of the failure, but not to define whether it is a failure or not. It usually lies with the operating department to say whether the engine has failed or not.

Chairman:

What strikes me as important about this paper is the bid for active co-operation between the different departments. That is something which must obtain on any road where you are going to have complete success, and even after that has been accomplished there will be difficulty in maintaining the schedules and keeping the freight moving, especially during the present labor shortage. Then there is the question of man-failure, which we cannot blame on the Engineering Department. Sometimes, also, work is done in a slipshod manner at running sheds and if we are not very careful in watching our reports and getting details we are not able to locate such trouble as may be due to bad workmanship, and some of it is due to the fact that we have had to employ men who are not qualified to handle the work. No doubt Mr. Sample has had experience along the same lines.

Mr. Sample:

I would say, speaking for the Grand Trunk, that we have a good many engine failures reported. If an engine fails for steam and loses ten minutes between here and Coteau but afterwards makes up the ten minutes and arrives at Ottawa on time, she is shown as having failed just the same. There are so many things which are not engine failure but which can be charged up as engine failures. Of course, if an engine fails to make the time or draw its tonnage it may be due to the design or to improper workmanship, and there are a dozen and one things which can be considered as the cause. The L. & N., I understand, have a system of tracing each engine failure to its origin. They have a blue print on which the different parts of the engine are shown, and on this blue print (which is attached to the casualty report) the place of the fracture is marked in red ink. The report is then sent to the Superintendent or Superintendent of Motive Power, who can see just where the part gave out, and they go to work and strengthen that point. If it is due to weak design you can correct it, but if it is due to flaw in the metal you may correct it and you may not. There are so many things which cause engine failures that I do not see how you are going to avoid them except by taking the strictest care of your power, and everybody co-operating with you. There is no use in trying to make an engine failure out of a "train dispatcher" failure. Each department should be big enough to acknowledge their own thoubles, if they have any. If an engine derailment is due to rough track, and you figure on correcting the trouble, you must find out where it exists, and if the Superintendent of Motive Power finds fault with the Master Mechanic because he does not get the results he should, and he can trace it somewhere it does not follow that it is going to correct the trouble. The shops do their work and we have had enough trouble to keep the work going and get the engines out. If we all put our shoulder to the wheel and work in one direction we will serve better than if we work in the opposite direction.

Mr. McMillan:

Mr. Sample has covered the ground very nicely from a locomotive man's point of view and I do not think I could improve in any way on what he has said. I can also agree with all Mr. Appleton has said in his paper on this subject.

Chairman:

I can fully agree with what Mr. Sample has said about a

locomotive losing five or ten minutes on a run but making it up before reaching the terminal, and can further say that the locomotive sometimes recovers detention caused by some other department, and I could never see the reason or commonsense in charging it with a failure in a case of this kind. We have locomotives pulling trains over the road which are detained for various reasons and which pick up and take the trains in on time after heavy relays, but for this we receive no credit. It seems to me there should be a balance struck of the operations of each locomotive and the Mechanical Department should receive credit every month for its good operations, at the same time, that it receives debit for the poor ones. You will find invariably that nothing is said about detention from other causes which the locomotive redeems in the schedule.

Mr. W. C. Hunter:

The paper presented to-night has been splendidly prepared and I only regret that Mr. Appleton is not here to answer some questions. I can look at this subject from the standpoint of a locomotive engineer and can supplement the remarks of Mr. Sample (which well covers the ground) when he speaks of delays and charges to the locomative for which it is not desponsible. I remember one time being charged up with engine failure when an engine truck cellar bolt sheared off, due to rough track and caused six minutes delay, but I got no credit for making up time afterwards. In regard to the system described in this paper it seems to me the success of it all lies in that team work which is asked for by Mr. Appleton, and if that is carried out, and the Operating Department, as soon as they discover anything that would be an advantage to the shop, will take it up with the proper officer, a great deal can be accomplished. As Mr. Sample says, the Shop Superintendent is generally after output and the fellow who runs the trains can often find fault with this desire for output, unless it includes efficiency.

Mr. Sample:

I notice in this form Mr. Appleton refers to 100,000 90,000 ,80,000 and 70,000 miles. I assume he means that the engines should make this mileage before they are shopped.

Chairman:

That is my understanding. I think he refers to that in the first part of his paper.

Mr. Sample:

It is unfair to expect a locomotive to perform as satisfactorily during the 100,000 mile period as during the 50,000 mile period. A good many roads have the practice of reducing the tonnage or requirements of an engine after it has run a certain number of miles—some say 10,000 miles, some say 5,000 miles, and so on. Some take them in, give them a touch up and call for the 100% performance. I believe the C. P. R. have a very good practice of looking after that part of it, but there is one thing we can say about the Canadian Government locomotives since Mr. Appleton has had charge of them, and that is that they are in the best condition I have ever seen them, and I have known them for the past 25 years.

Mr. Smart:

In connection with that statement—Mr. Appleton has pointed out to me that there are locomotives in freight service which have made over 100,000 miles. I do not know how that compares with the locomotives of other roads. I have also known him to refer to switch engines running over 120,000 miles before going in for general repairs. As to passenger engines, I do not know just what the mileage is but in the upper column of the statement you will see No. 407—there is 100,000 to 105,000 miles; that is a passenger engine which makes over 100,000 miles.

Chairman:

I do not think he could get 100,000 miles out of a switch engine if used to capacity.

Mr. Sample:

You cannot get it out of the tubes. We figure the number of miles from the trips. He must base his from the general repairs.

A Member:

Mr. Appleton refers to renewing sections of the tubes, and considers that in the total mileage .

Mr. Smart:

These figures are the actual mileage that locomotives make between general repairs.

Mr. Mimms:

Regarding co-ordination between the different departments, there are those who claim that there is not sufficient co-ordination between the Stores Department and the others. It is a fact that if the stores do not furnish promptly material required for repairs to locomotives held on the line, the engine is not doing its fair proportion of work on the road. In one case I am aware of, a long delay occurred because the store where the engine was held did not have material available while at another division point there was a large quantity.

Mr. Cunningham:

The Stores Department of a railway stands in the same relation to the railroad as the army service corps stands to the army. Adequate service is imperative to keep the machinery going. One of the establishedrules with the Canadian Pacic Rly. is that when certain locomotives are removed from one district to another the material goes with the engines. The fullest co-operation exists between the Mechanical and the Stores Department in the movement of such material. This has been the result of a process of evolution and is found widely necessary.

I was much impressed with Mr. Appleton's request for co-operation. In this war we have had one of the greatest examples of co-operation the world has ever witnessed. An agglomeration of nations banded together to accomplish one single purpose, to put the enemy across the Rhine, and they have done it. In a like, though infinitely smaller degree, an individual, when dealing with daily problems, is bound to come nearer to accomplishment of the desires of his management by an evident spirit of co-operation. It is what we like to talk about, it is good for us to give tangible evidence of it. Much can be said, but the statement should not be void of individual effort. Individual co-operation, to my mind, is the main spring.

Referring to other parts of this excellent paper; no doubt the chart giving certain mileage is intended to represent the mileage between periods of general repairs. Pacific type of locomotive mentioned would probably be in passenger service, and Mr. Appleton has set up an attainable mileage mark of 100,000 miles. The other classes shown, as Mikado, Sante Fe and ten wheelers are not expected to accomplish as much, being in freight service, and for them a gauge is set at 90,000 miles between general repair periods. Switchers are in a different class, the mileage of a switcher is usually figured on an arbit-

rary basis of fixed miles per hour, locomotives may perform a great deal more or less in service, but this is on an arbitrary basis. If I understand Mr. Appleton's excellent paper correctly the advancing cost of labor and material making repairs has developed greater necessity to establish some gauge to mark returns for the outlay, and in that effort, certain estimates of attainable mileage are set up. In other words, if $3,000.00 is paid for a No. 1 repair, mileage performance is expected approaching figures given in this paper. I am grateful to Mr. Appleton, for I have enjoyed hearing the reading of his paper.

Mr. Gordon Mitchell:

There is one point upon which no one present this evening has touched seriously, and upon which Mr. Appleton appears to place considerable emphasis. He says towards the end of his paper, "To sum up, I would like to say that co-operation between the various branches of the Mechanical Department depends very much more on the men than on the system." That, gentlemen, in all departments, is what everything goes back to—the human element. Many of you gentlemen here, like myself, are the heads of departments, and you handle men, you find just the same conditions existing in the human element, in the engine shop, that I find amongst men who construct buildings, and you must have repeatedly asked yourselves why is it the average man works only for his wages? He should have a higher incentive. No man makes a success of life who works for wages. Young men should be encouraged by their superiors to do work of which they have reason to be proud, and only when this stage is reached will men be happy. Their minds will then dwell less upon the hands of the clock and the figure upon the pay cheque, and then life will be more worth living. Excel in any work and it then becomes a pleasure, not a drudgery.

In engineering, railway work and manufacture, there is no country that can beat England. They have held the markets of the world in spite of all Germany's unfair methods of trade. Every country of the world is prepared to pay more for English goods than for those "Made in Germany." England's markets are so secure, and her manufactures so excellent, that she practically says to the world: "There are our goods, if you don't like them at our price you need not take them."

The main reason the world wants British manufacture is that it is honest, and this is a reflex not only on the heads of

departments, but also on the men and women who are directly responsible for the manufacture.

The English railway locomotive, as an example, although quite unsuited for Canadian conditions, holds wonderful records both for effieiency and durability, and can hold its own the world over.

Canada being a new country, we have been in the past compelled to do our work in a more or less slipshod manner. We are now beyond that stage, and such methods must be discarded. "Good enough" should no longer be permitted, even if it takes less time to produce than "Good," and there can be no question as to which of these is the cheaper in the long run.

Anything that is worth doing is worth doing well.

It is our duty to encourage all men to take a real live interest and pride in their work, no matter whether it be highly scientific, or unskilled labor; and then only may we hope to eliminate the common practice of shirking the responsibility which is justly ours, and the perpetual failure which occurs both in engines and men.

Mr. Sample:

The only thing I disagree with in what the gentleman has just said is that the English goods beat the United States goods.

Mr. Mitchell:

I did not say that, what I did say was that the goods of British manufacture beat every country in the world.

Chairman:

We have had a unique experience here to-night of a Scotchman praising an Englishman. I have heard an Englishman praising a Scotchman but have seldom heard a Scotchman praising an Englishman.

Secretary:

As already explained by the President, we were to have had Mr. Appleton's paper last month, but it was decided to have it read to-night, and Mr. Appleton being unable to be present arranged for Mr. Smart to represent him. To-night we received a telegram from Mr. Appleton that the train, which is due to arrive here at 7.30 was two hours and 15 minutes late, so there was not any possibility of his reaching the meeting on time. On the subject to-night, I can only bear out what Mr. Mimms has said. For years the drawing office

has been the muffer beam between the other departments. If anything goes wrong one department blames the drawing office and the other department, but the drawing office has always endeavored to carry out any improvements that could be incorporated in the design of the locomotive. I am glad to hear outsiders taking part to-night. Mr. Mitchell is very witty when he gets up to speak, and we have heard him here before in a paper. I am sorry we did not have more locomotive men here to-night.

Chairman:

The paper to-night is very thorough and complete and I am sure Mr. Appleton will regret that he could not be with us to discuss it, but we wish to thank Mr. Smart for the able manner in which he has read it. I will be glad to hear a motion conveying a vote of thanks to Mr. Appleton. I thank you for your attendance to-night.

Mr. Cunningham:

I have much pleasure in moving a vote of thanks to Mr. Appleton for his excellent paper.

Mr. Smart:

I second that.

Chairman:

You have heard the motion. Please signify in the usual manner.

Carried.

Mr. Smart:

I do not know that I can add anything further, but will be glad to express to Mr. Appleton on my return home your appreciation of his paper, and I think Mr. Appleton would like the privilege of having his paper left open so that it could be discussed at some future meeting, when we have more present from the Motive and Operating Departments.

Chairman:

The suggestion is a good one, and the members will understand that at the next meeting we will take up this paper under the subject of "Unfinished discussion of previous paper."

Mr. Sample:

I would like to request that a copy of this paper be sent to the Superintendents of Motive Power of two western roads. Mr. J. F. Farr of the Grand Trunk Western Lines and to Mr. Flynn of the Michigan Central.

Chairman:

Would it not be better to wait until the whole proceedings of the meeting are printed and send them to the persons mentioned.

Mr. Sample:

Allright.

Chairman:

Refreshments have been provided in the ante-room for the members and their friends. There being no further business we will now adjourn.

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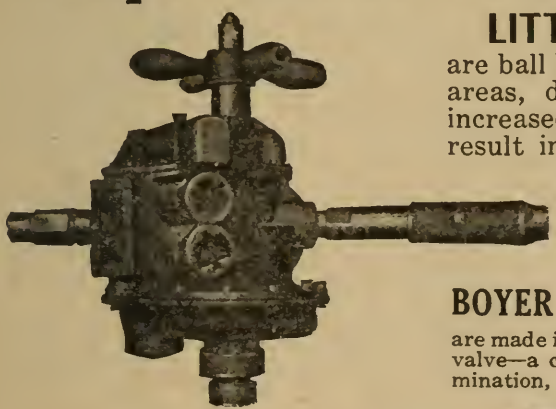

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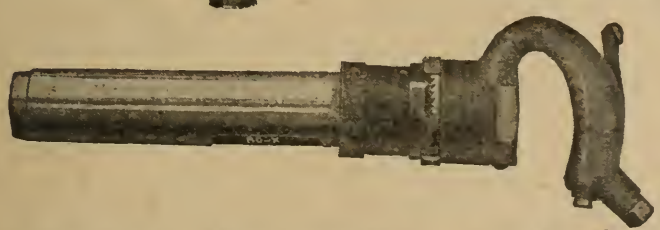

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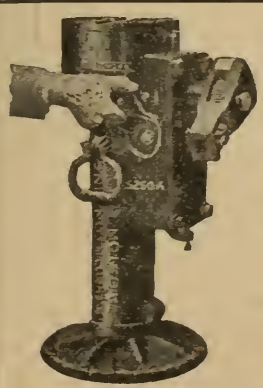

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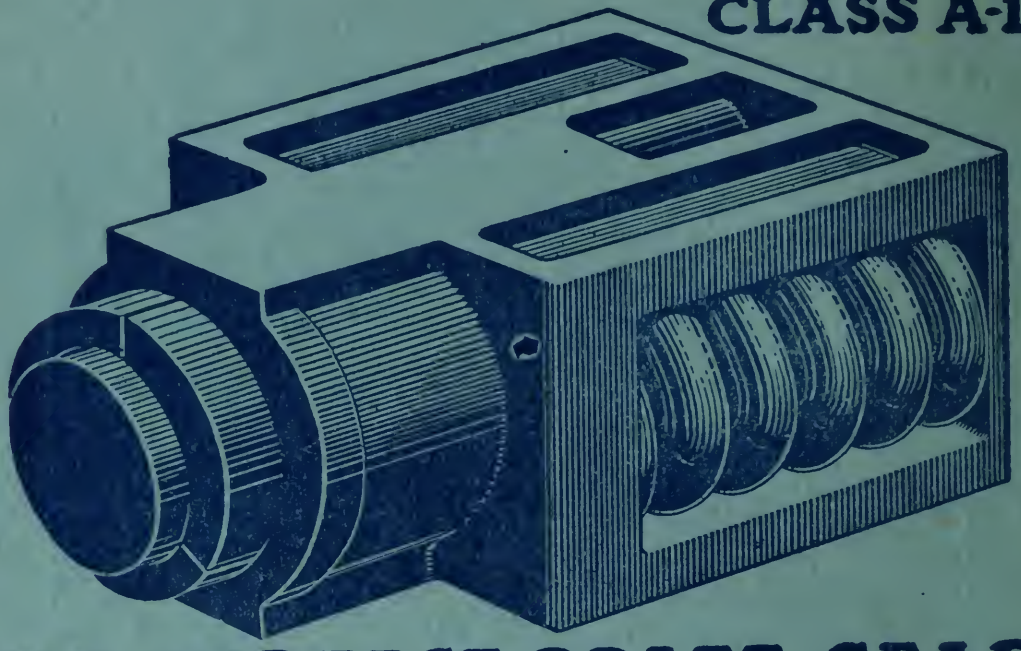

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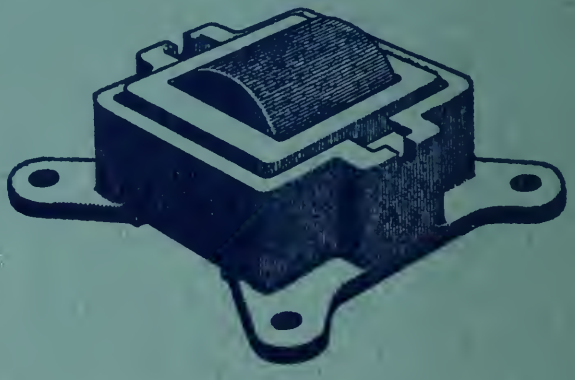

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